

BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - II COMPUTER SCIENCE & ENGINEERING-A&M : SUMMER : 2024
SUBJECT: MATHEMATICS FOR COMPUTING-II

Day : Tuesday
Date : 21/05/2024

S-23929-2024

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N. B. :

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable calculator is **ALLOWED**.
- 4) Assume suitable data, if necessary.

Q. 1 Find the Fourier series of (10)

$$f(x) = \begin{cases} \cos x & -\pi < x < 0 \\ \sin x & 0 < x < \pi \end{cases}$$

OR

Find the Fourier series of $f(x) = x - x^2$ in $(-\pi, \pi)$. (10)

Q. 2 Find the Fourier cosine transform of $f(x) = 2e^{-5x} + 5e^{-2x}$. (10)

OR

Find inverse Fourier cosine transform of $\frac{\sin a\lambda}{\lambda}$. (10)

Q. 3 Find the inverse Laplace transform of $\frac{s^2}{(s+a)^3}$. (10)

OR

Find the Laplace transform of $t \int_0^t e^{-2t} \sin t dt$. (10)

Q. 4 Change the order of $\int_1^2 \int_y^{y^2} f(x, y) dx dy$. (10)

OR

Evaluate $\int_0^1 \int_0^1 \frac{dx dy}{1 + yx^2}$. (10)

Q. 5 Find $\nabla^2 e^r$ where $r = \sqrt{x^2 + y^2 + z^2}$. (10)

OR

Show that $\vec{F} = (6xy + z^3)\vec{i} + (3x^2 - z)\vec{j} + (3xz^2 - y)\vec{k}$ is irrotational. Find the scalar ϕ such that $\vec{F} = \nabla\phi$. (10)

Q. 6 Using Green's theorem evaluate $\int_c (xy - x^2)dx + y^2 dy$ along the curve c formed (10)
by $y = 0, x = 1, y = x$.

OR

Evaluate $\iiint_S (4xz\vec{i} - y^2\vec{j} + yz\vec{k}) \cdot d\vec{s}$ over the cube bounded by the planes (10)
 $x = 0, x = 2, y = 0, y = 2, z = 0, z = 2$.

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